CFS.v2: CPC's Participation in the Evaluation Process and Some Results

Outline

- **A summary of CPC's participation in the CFS.v2 evaluation process**
- **Results**
  - ***Extended-range***
  - ***Seasonal***
  - ***Summary***
- **Lessons learned and some thoughts**

A Summary of CPC's Participation in the Evaluation Process

- In January/February 2010, CPC was provided with hindcasts from two months of initial conditions (February & November; 1982-2009)
- A summary of CPC's evaluation provided to the EMC
- In January/February 2011, CPC was provided with hindcasts from the rest of initial conditions
- In March 2011, CPC provided a summary briefing to the NCEP management as part of the model upgrade, and recommended implementation of the CFS.v2

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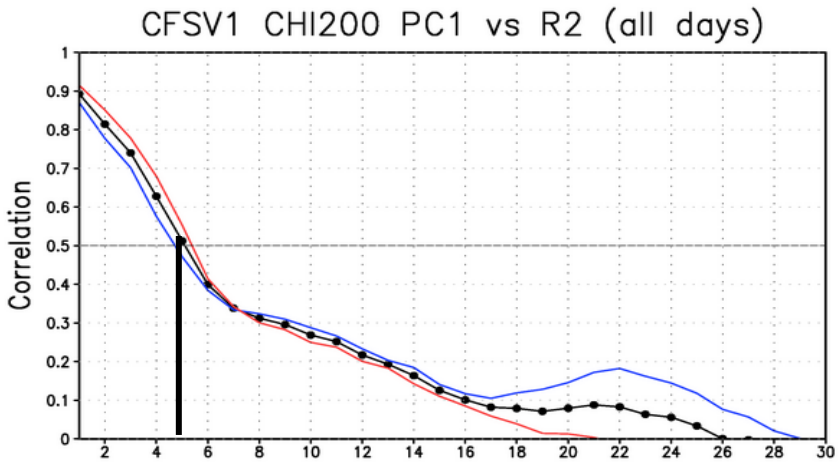
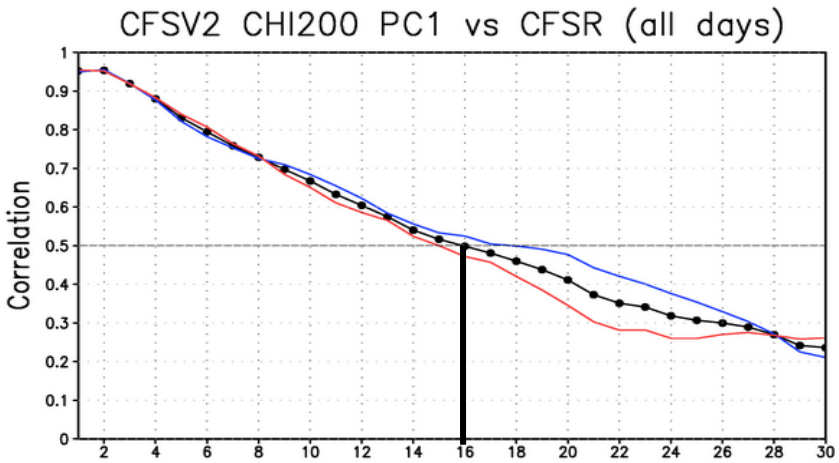
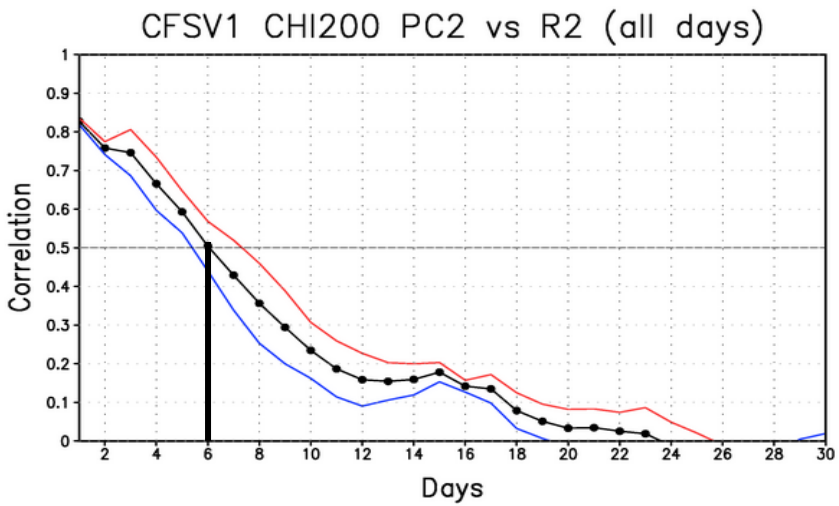
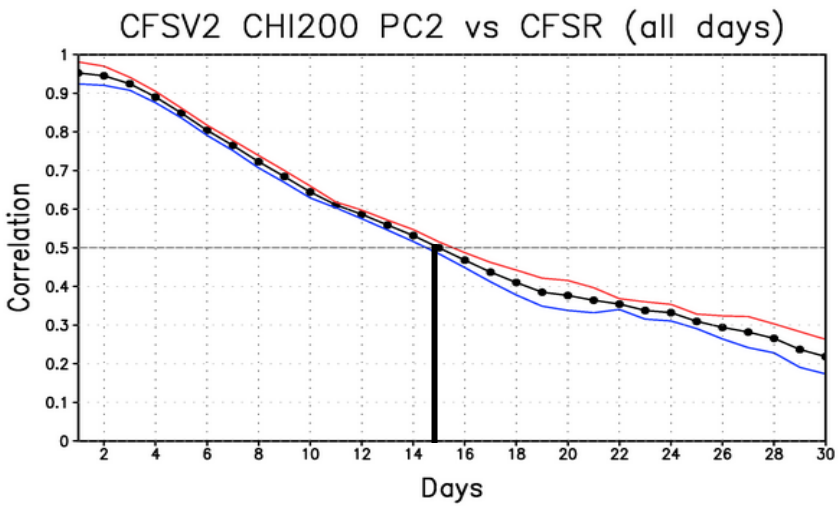
Assessment of MJO Prediction Skill

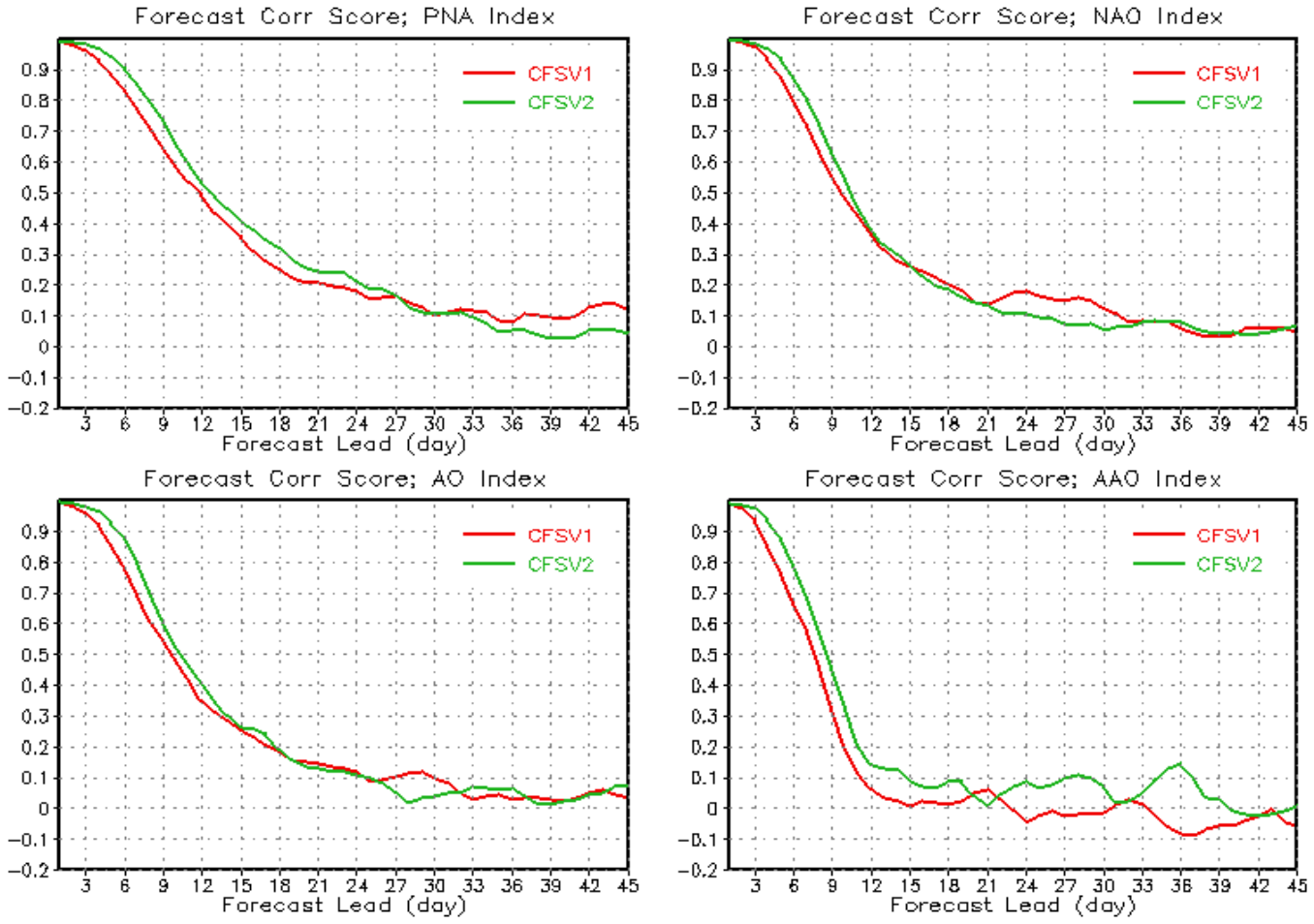








Anomaly Correlation for Atmospheric Indices



J. Schemm CPC/NCEP

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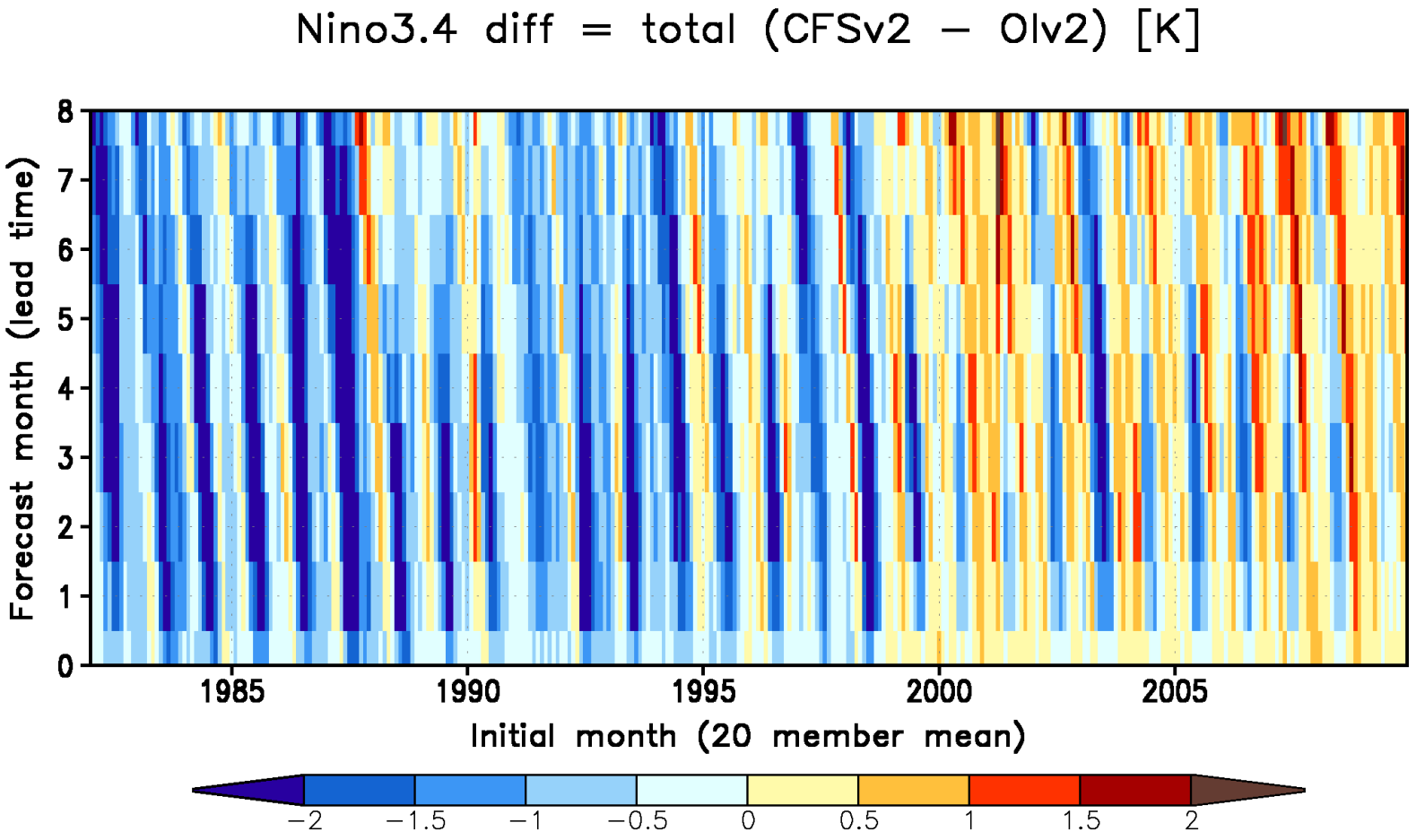
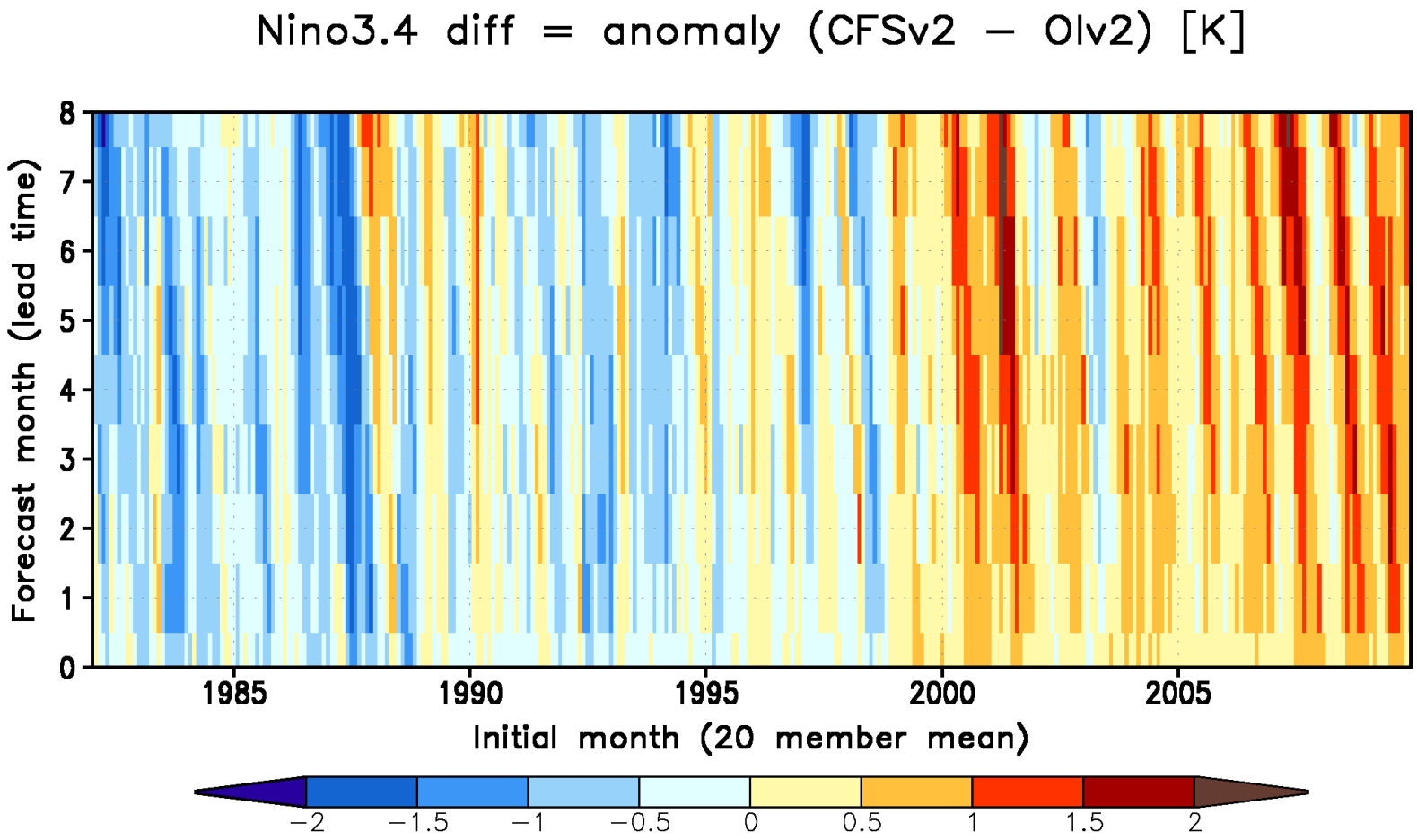
Some Background

A Distinct Change in Forecast Bias for SST After 1999



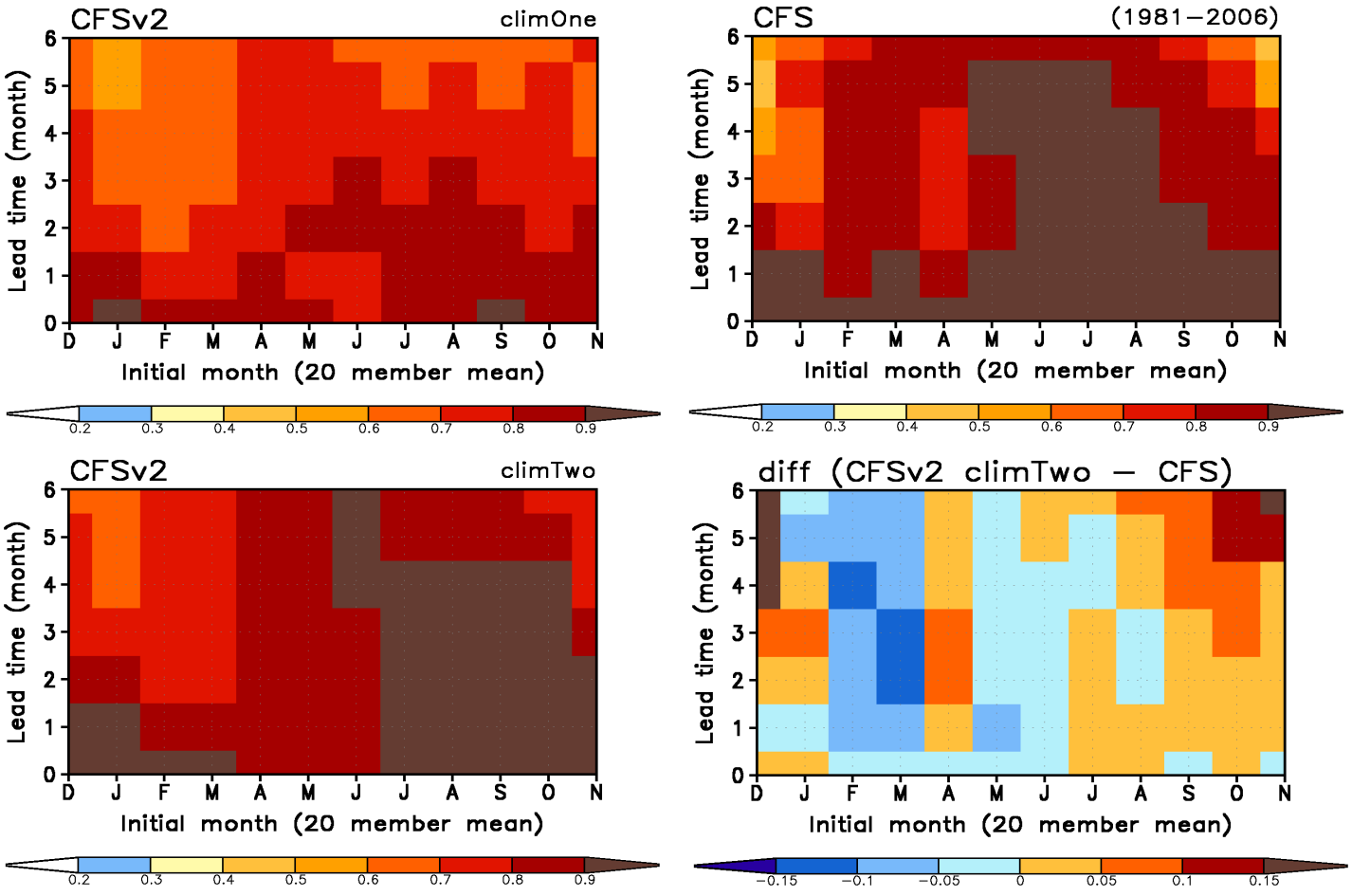
Anomaly Computed From One Climatology (1982-2009)



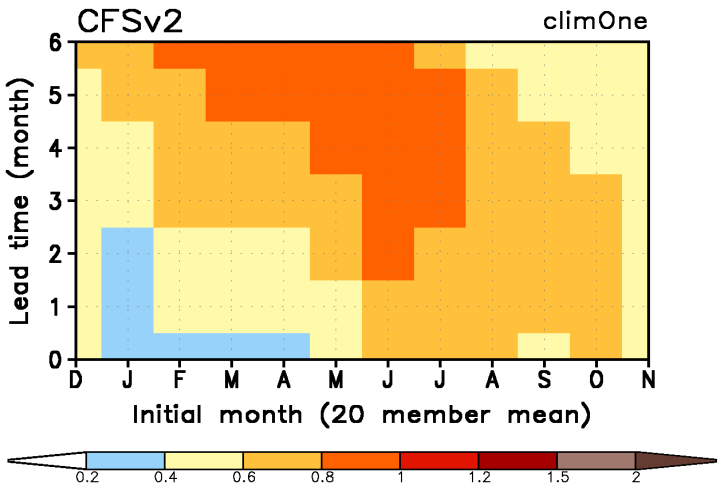
Seasonal Forecast and Verifying Data

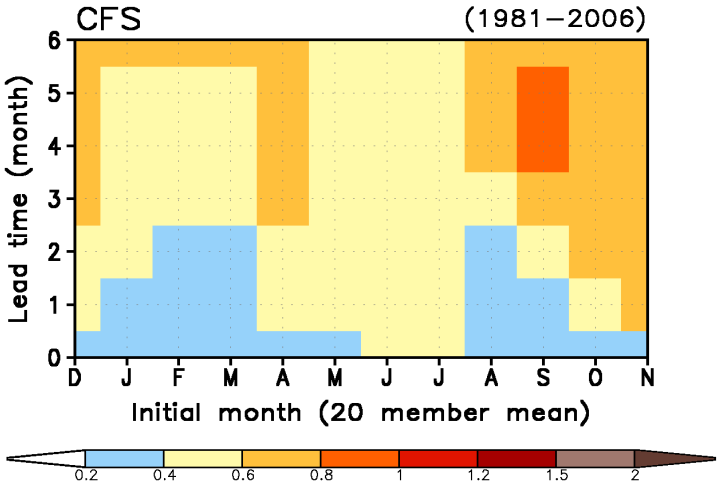
- **Forecast members**
  - ***CFSv2 20 members***
  - ***CFSv1 15 members***
- **Reforecast period**
  - ***CFSv2 1982-2009***
  - ***CFSv1 1981-2006***
- **Climatology**
  - ***CFSv2 climOne, 1982-2009***
  - ***CFSv2 climTwo, 1982-1998, 1999-2009***
  - ***CFSv1 1981-2006***
- **Variables: SST, T2m, Precipitation**
- **Observations**
  - ***OI SST***
  - ***CAMS surface temperature: GHCN-CAMS***
  - ***CAMS-OPI rainfall***

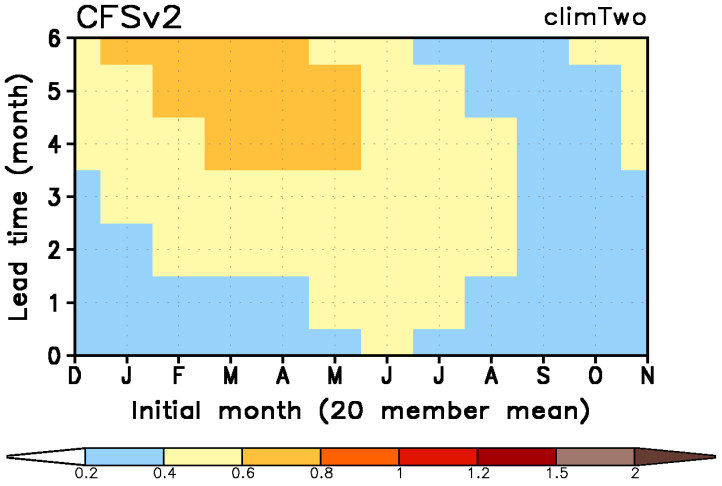
Anomaly Correlation for Nino3.4 SST Index

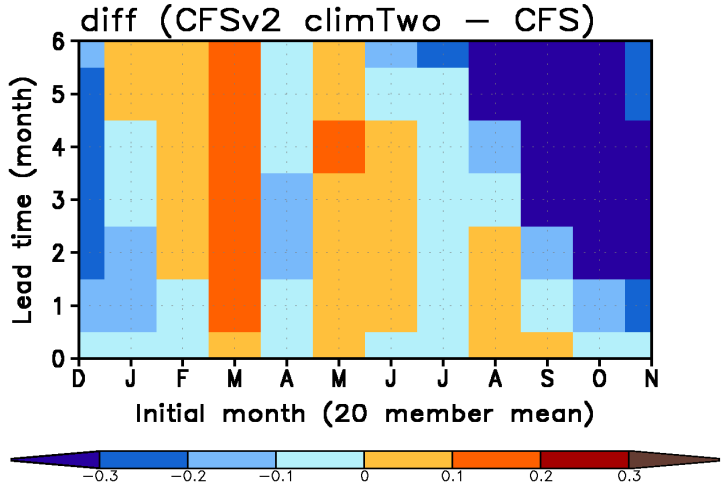


RMSE for Nino3.4 SST Index

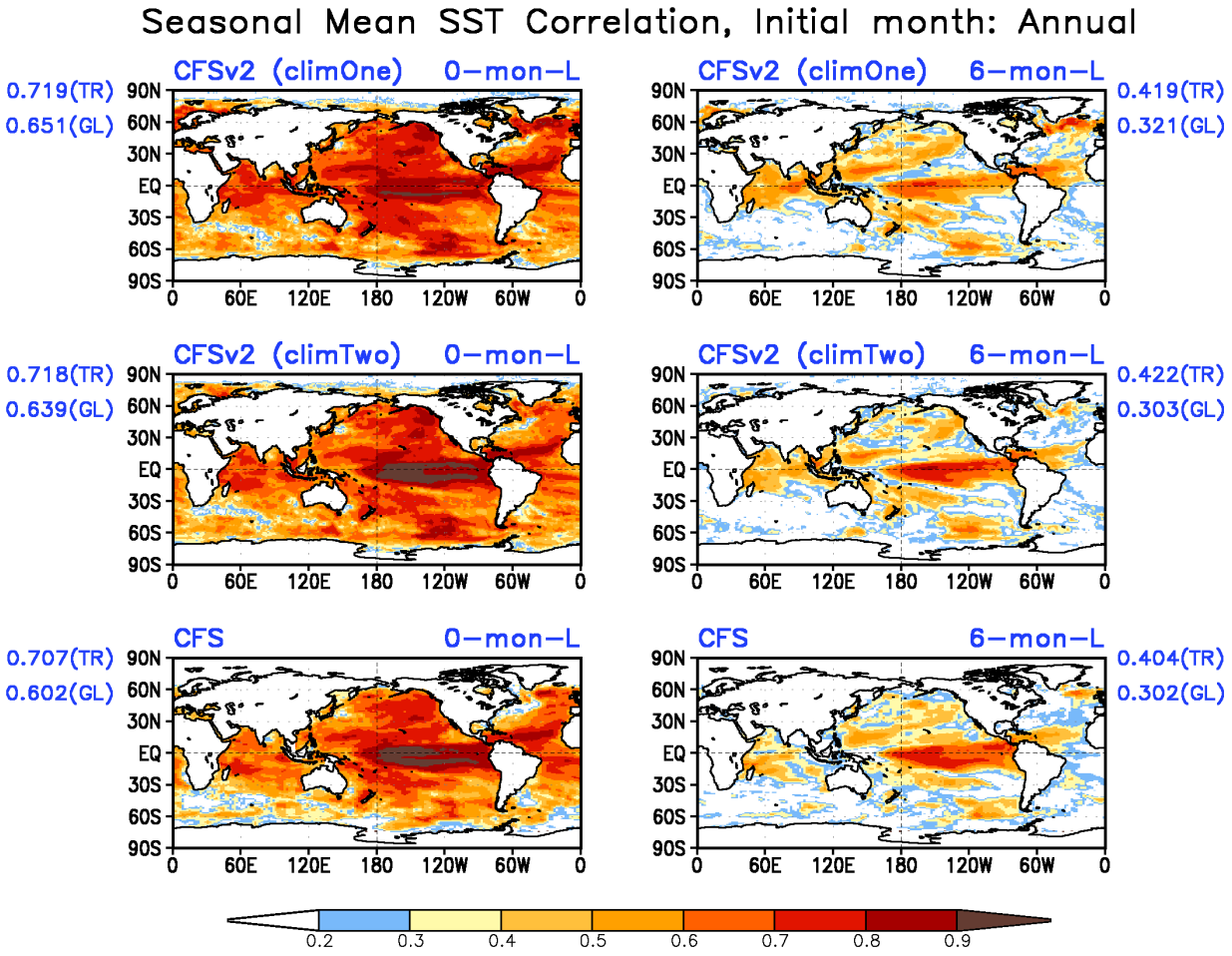




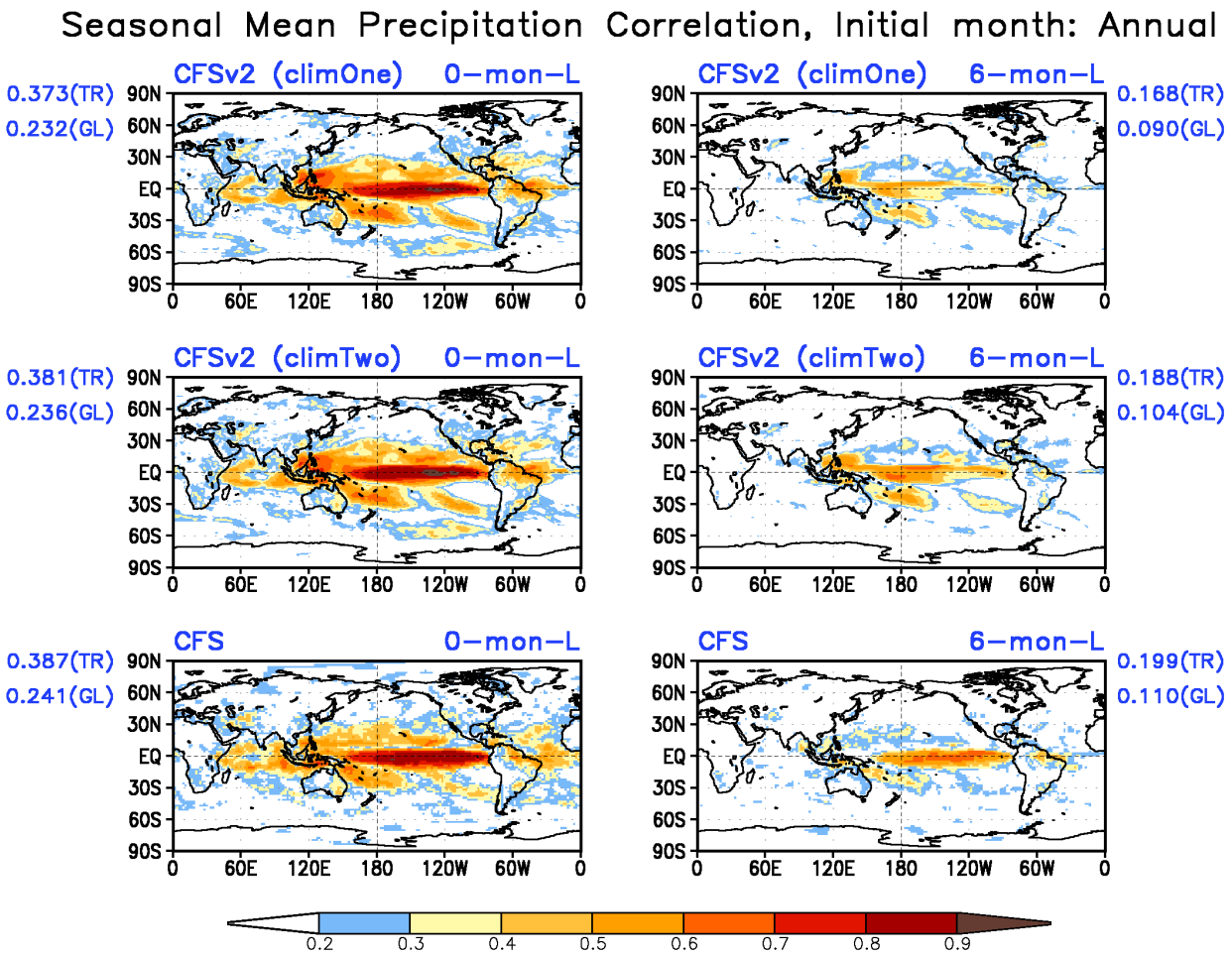




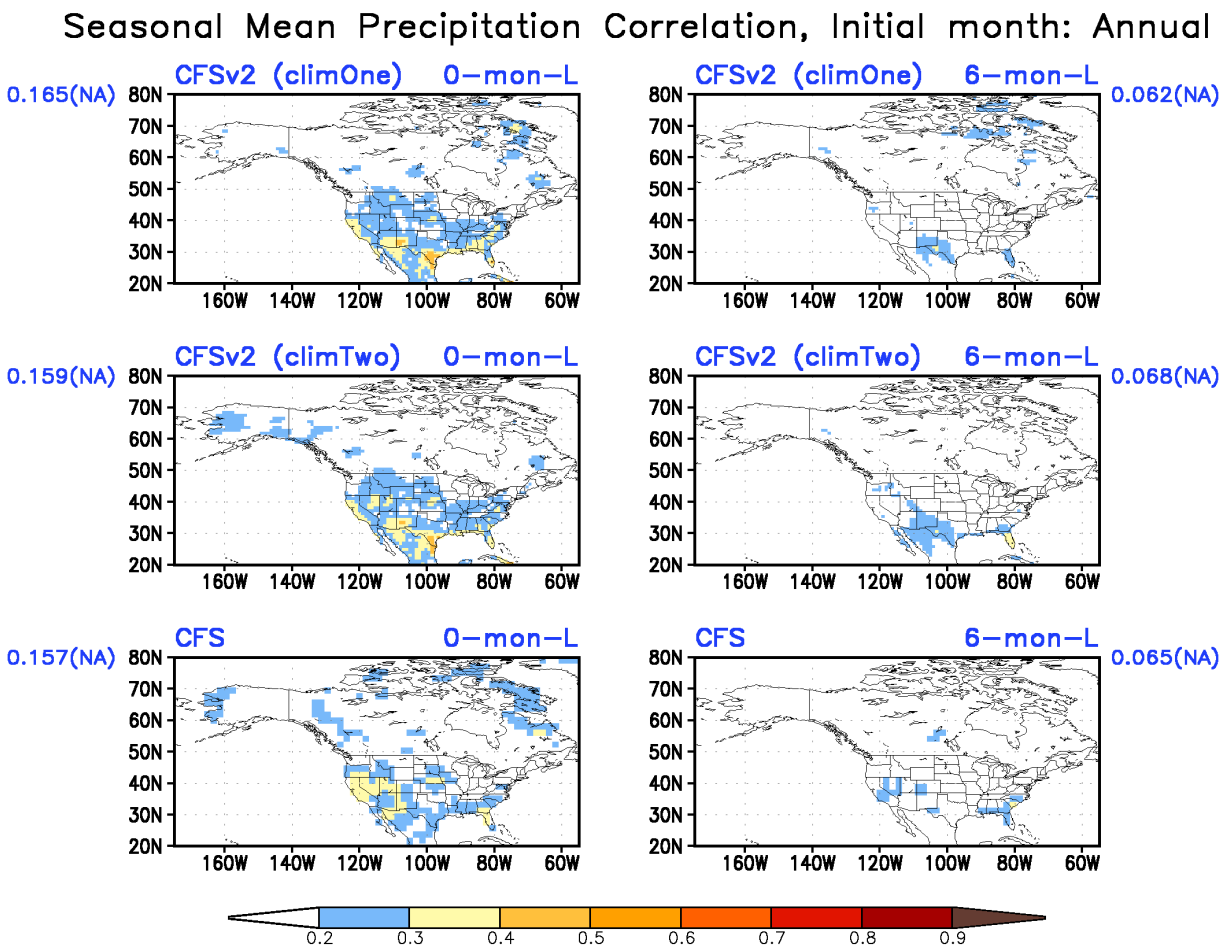
Anomaly Correlation – SST



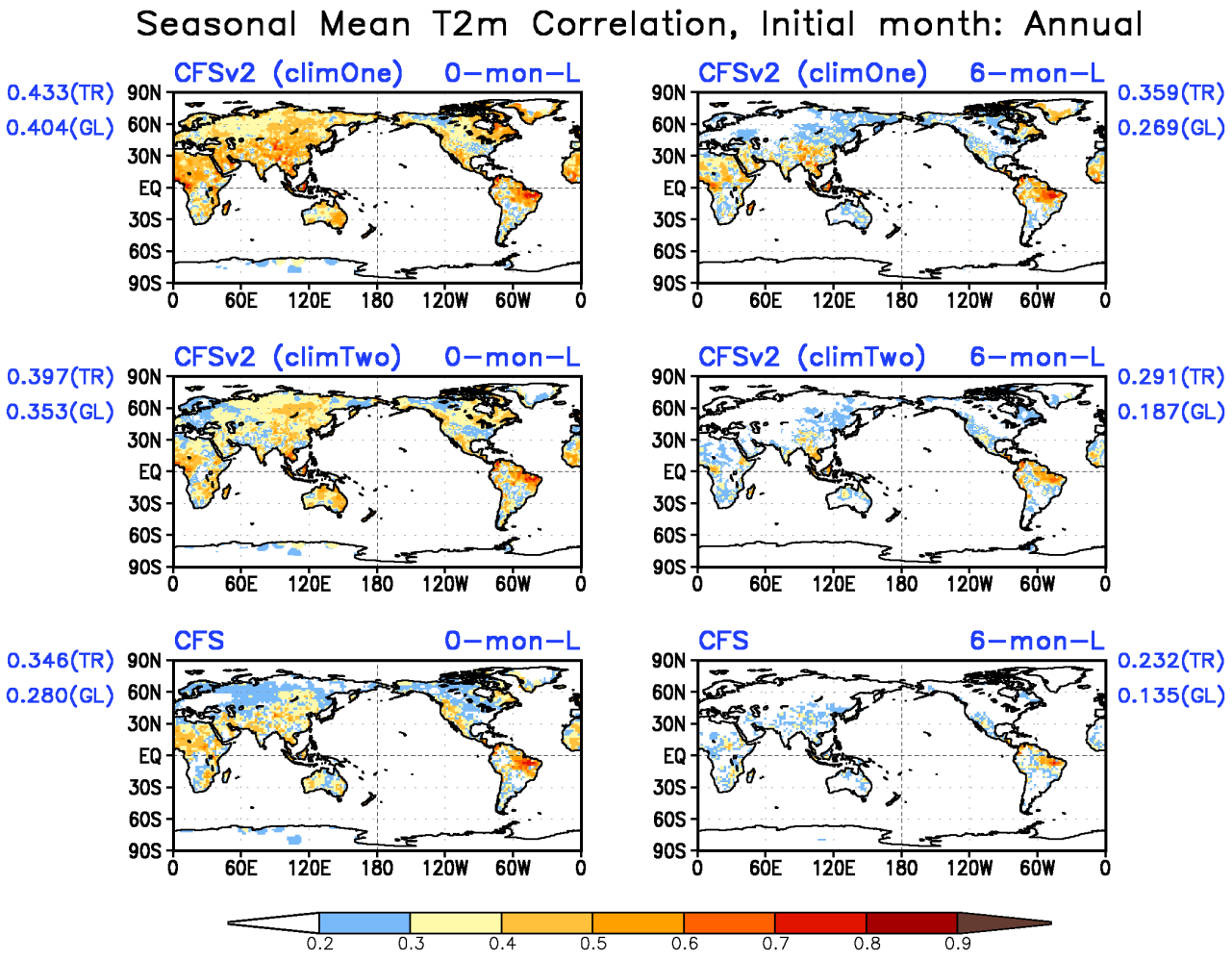
Anomaly Correlation – Precipitation



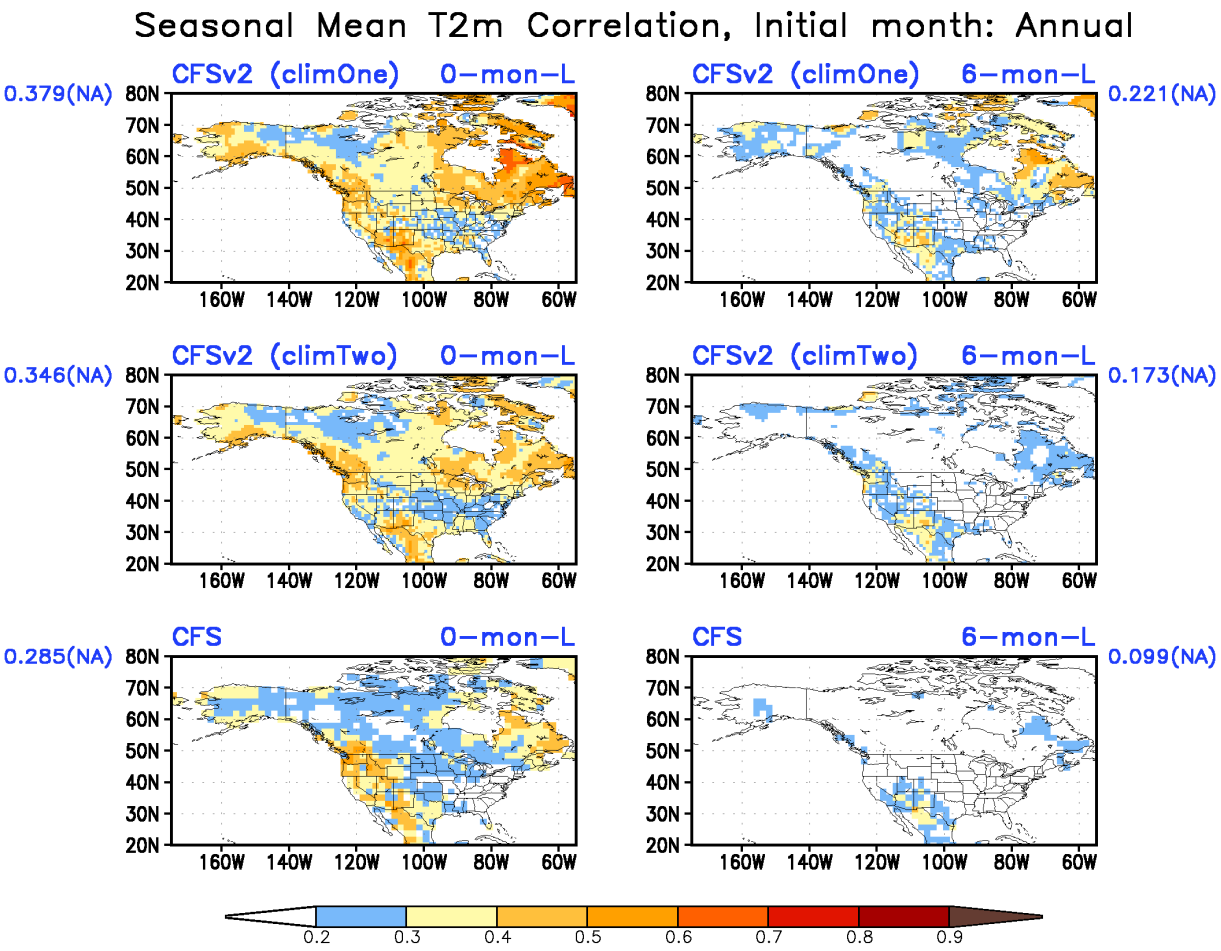
Anomaly Correlation – Precipitation



Anomaly Correlation – Sfc. Temp.



Anomaly Correlation – Sfc. Temp.



Summary and Recommendation

- **Clear improvements in the skill of extended-range predictions**
- **For seasonal predictions**
  - ***Surface temperature forecasts have clear improvements due to time-varying CO_2***
  - ***Not much change in the skill of precipitation forecast***
  - ***SST forecast in extratropical oceans is better; in tropics similar for AC; better for RMSE***
- **Change in forecast bias is something users have to learn, and deal with**
- **Recommendation – CPC approved the CFSv2 implementation**

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Lessons Learned and Some Thoughts

- **Upgrades to seasonal prediction system are fundamentally different from the upgrades in weather prediction models**
- **This is mainly because of long-range predictions require "hindcasts" for the computation of real-time anomalies, and**
- **NCEP needs to distribute the hindcast data; users need to access the hindcast data, calibrate their application models, and gain familiarity with the nuances of the prediction system. And all this requires a fair amount of time**

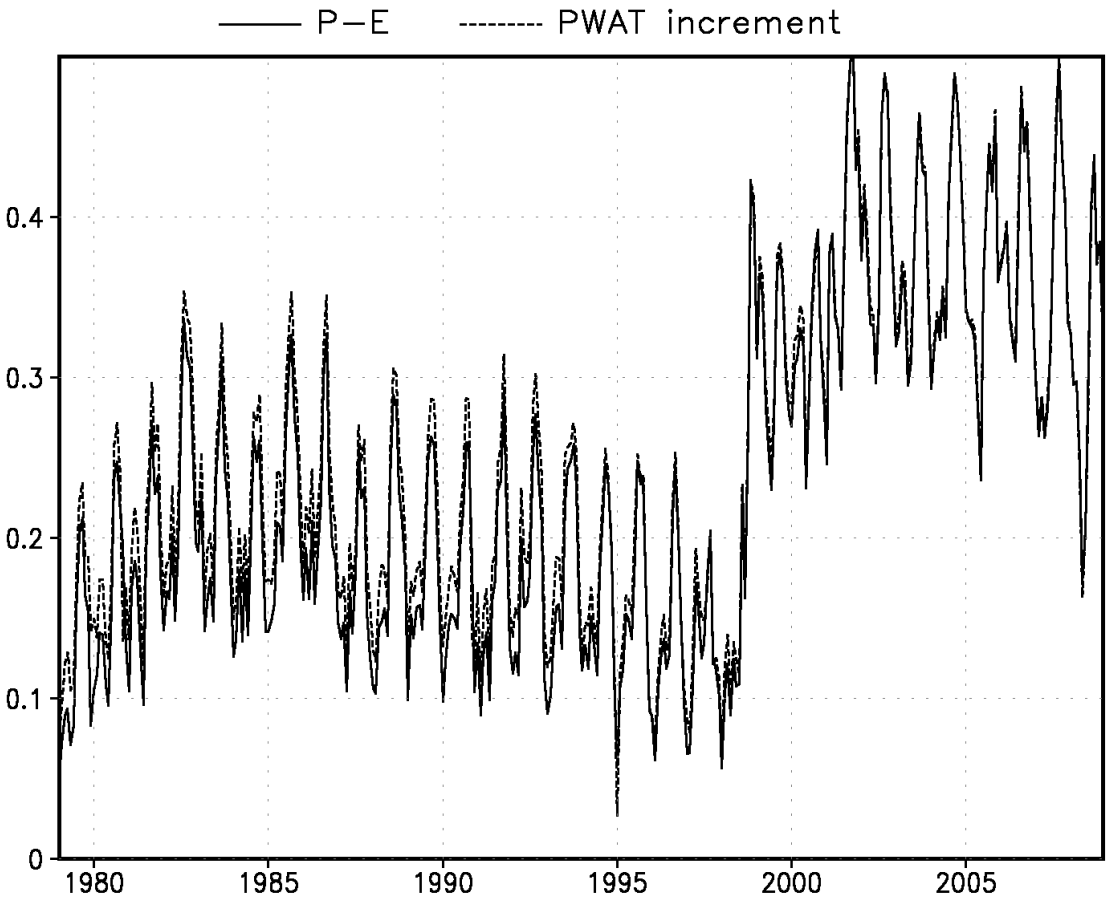
Lessons Learned and Some Thoughts

- **Would like some information on what was EMC's developmental pathway for the CFS.v2? and what were the evaluation metrics and decision points before the model is frozen**
- **Efforts need to be made to minimize spurious jumps in initial conditions (e.g., in 1999)**
- **Would like some assessment of model biases before the hindcasts begin (e.g., availability of ~ 30-year free coupled run)**
- **How will the extensive diagnostics that CPC perform on the CFS.v2 will feed into the development process for the next version?**
- **Changes between model versions, and from the reanalysis (i.e., the CFSR) model, should be documented**

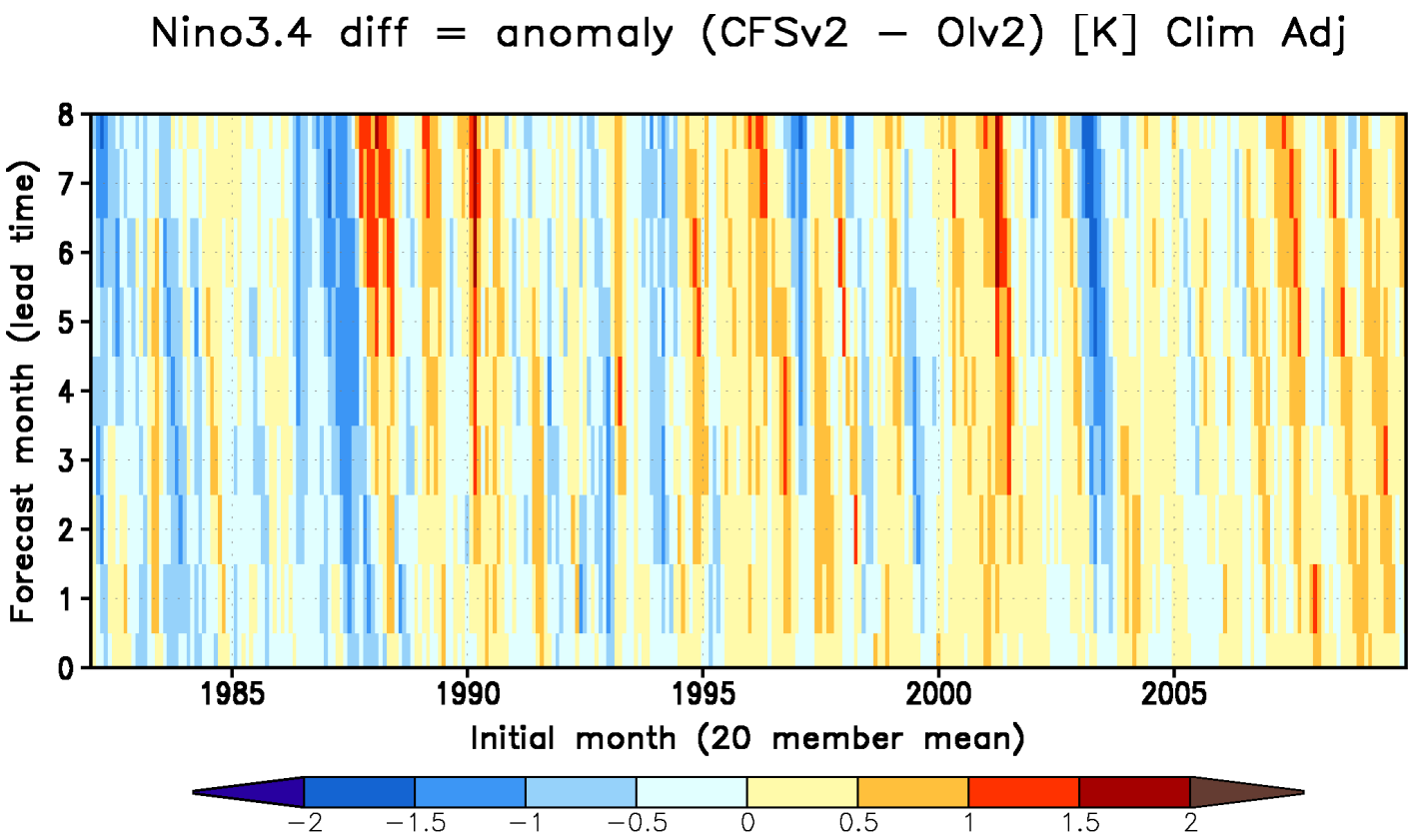
The change has something to do with changes in the CFSR after 1999 (ATOVS)

P-E

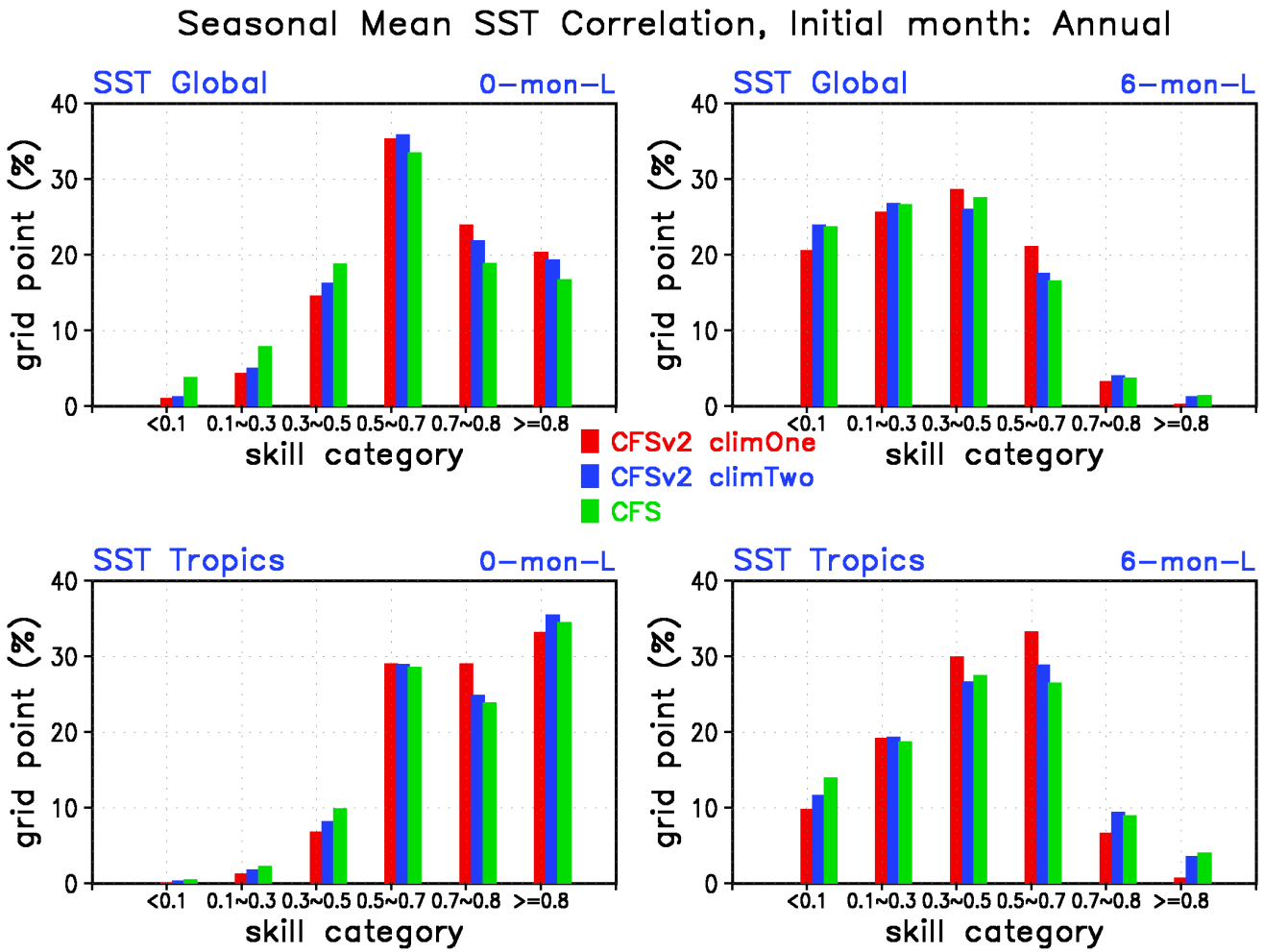
Increment in Precipitable Water



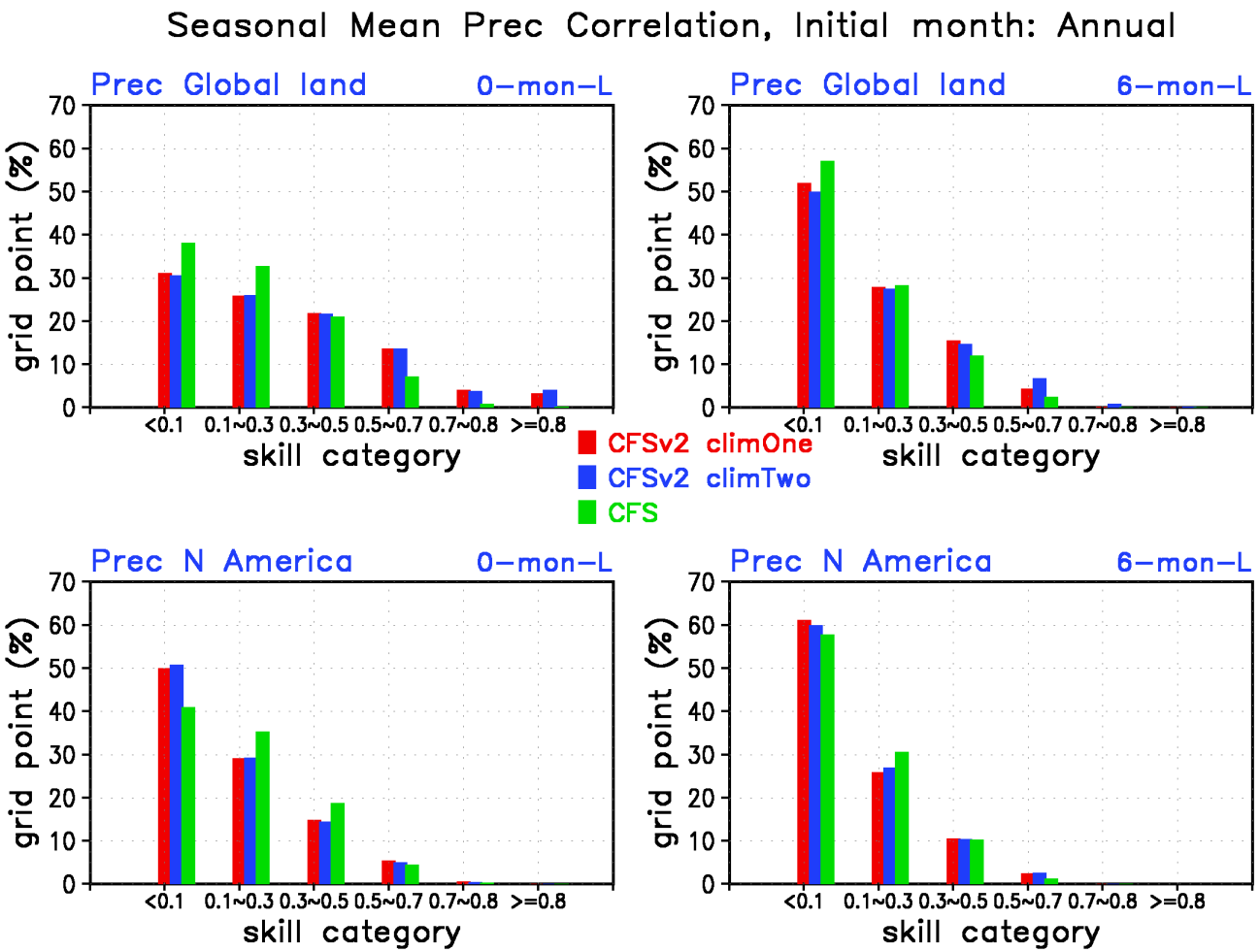
Anomaly Computed From Two Climatologies (1982-1998 & 1999-2009)



Anomaly Correlation – SST



Anomaly Correlation – Precipitation



Anomaly Correlation – Sfc. Temp.